

CAREER & TECHNICAL EDUCATION (CTE)

&

PROJECT LEAD THE WAY (PLTW)

HYBRID PATHWAYS

**CTE-PLTW HYBRID
CAREER PATHWAYS
2015-2016**

**DESIGN ENGINEERING
CIP 15.1304.00**

PATHWAY DESCRIPTION: This pathway provides the opportunity to blend Career & Technical Education (CTE) courses with Project Lead the Way (PLTW) courses to help students apply technical skills along with science, technology, engineering, and math (STEM) skills to solve real-world problems. Design Engineers have a working knowledge of mechanical parts as well as computer-aided design (CAD) software, such as AutoCAD. Mechanical designers begin a project by meeting with project managers, engineers, and clients to understand the needs and requirements for a new product or mechanical system. For example, designers working on a project to create an automobile engine may consult engineers regarding which structural materials to use or clients regarding engine efficiency requirements. Once materials and specifications have been determined, designers begin using CAD software to plan and develop models.

BEST PRACTICE CORE

**EXAMPLE
ILP-RELATED
CAREER TITLES**

*Foundational Skills Necessary for Career-Ready Measure:
(KOSSA/Industry Certification)*

*Complete (5) **FIVE CREDITS** from the following :*

- 219901 Introduction to Engineering Design (**PLTW**)
- 480110 Introduction to Computer Aided Drafting
- 480136 Parametric Modeling
- 480113 Engineering Graphics
- 219906 Engineering Design & Development (**PLTW**) OR
219902 Principles of Engineering (**PLTW**)

Note: (PLTW) courses require an agreement between Project Lead The Way and the Local School District please see the link to [PLTW Program Requirements](#) for further information.

Engineer Technician
Electrical Engineer
Industrial Engineer
Mechanical Engineer
Civil Engineer

**CTE-PLTW HYBRID
CAREER PATHWAYS
2015-2016**

**COMPUTERIZED MANUFACTURING AND
MACHINING (CMM) ENGINEERING
CIP 15.1304.00**

PATHWAY DESCRIPTION: This pathway provides the opportunity to blend Career & Technical Education (CTE) courses with Project Lead the Way (PLTW) courses to help students apply technical skills along with science, technology, engineering, and math (STEM) skills to solve real-world problems. CMM Engineers design, develop and run programs which direct machines to cut and shape metal or plastic for such things as airplanes, automobiles and other industrial machines. CMM Engineers use blueprints and 3-dimensional computer designs to create the programs which result in precisely cut products.

BEST PRACTICE CORE

**EXAMPLE
ILP-RELATED
CAREER TITLES**

*Foundational Skills Necessary for Career-Ready Measure:
(KOSSA/Industry Certification)*

*Complete (5) **FIVE CREDITS** from the following :*

- 219901 Introduction to Engineering Design (**PLTW**)
- 470913 Fundamentals of Machine Tools-A
- 470914 Fundamentals of Machine Tools-B
- 470915 Manual Programming
- 219904 Computer Integrated Manufacturing (**PLTW**)

Note: (PLTW) courses require an agreement between Project Lead The Way and the Local School District please see the link to [PLTW Program Requirements](#) for further information.

Machine Operator
Machinist Technician
Machinist
Maintenance Machinist
CNC Machine Operator
CNC Programmer
Quality Control Manager
Mechanical Engineer
Engineer Technician
Industrial Engineer

**CTE-PLTW HYBRID
CAREER PATHWAYS
2015-2016**

**WELDING ENGINEERING
CIP 15.0614.00**

PATHWAY DESCRIPTION: This pathway provides the opportunity to blend Career & Technical Education (CTE) courses with Project Lead the Way (PLTW) courses to help students apply technical skills along with science, technology, engineering, and math (STEM) skills to solve real-world problems. Welding Engineers design and develop metal components for products for the pipeline, automotive, boiler making, ship building, aircraft and mobile home industry. Welding Engineers must have knowledge of cutting processes and gas metal arc welding procedures for efficient development of these industrial processes.

BEST PRACTICE CORE

**EXAMPLE
ILP-RELATED
CAREER TITLES**

*Foundational Skills Necessary for Career-Ready Measure:
(KOSSA/Industry Certification)*

*Complete (5) **FIVE CREDITS** from the following :*

- 219901 Introduction to Engineering Design (**PLTW**)
- 480505 Blueprint Reading for Welding
- 480501 Cutting Processes
- 480522 Gas Metal Arc Welding
- 219902 Principles of Engineering (**PLTW**)

Note: (PLTW) courses require an agreement between Project Lead The Way and the Local School District please see the link to [PLTW Program Requirements](#) for further information.

Pipe Welder
Certified Welding
Inspector (CWI)
Certified Welding
Educator (CWE)
Welding Engineer
Structural Engineer
Mechanical Engineer

**CTE-PLTW HYBRID
CAREER PATHWAYS
2015-2016**

**ELECTRICAL ENGINEERING
CIP 14.4101.00**

PATHWAY DESCRIPTION: This pathway provides the opportunity to blend Career & Technical Education (CTE) courses with Project Lead the Way (PLTW) courses to help students apply technical skills along with science, technology, engineering, and math (STEM) skills to solve real-world problems. Electrical Engineers apply electrical theory and related knowledge to diagnose and modify developmental or operational electrical machinery and electrical control equipment and circuitry in industrial or commercial plants and laboratories. Electrical Engineers experiment with motor-control devices, switch panels, transformers, generator windings, solenoids, and other electrical equipment and components according to engineering data and knowledge of electrical principles.

BEST PRACTICE CORE

*Foundational Skills Necessary for Career-Ready Measure:
(KOSSA/Industry Certification)*

*Complete (5) **FIVE CREDITS** from the following :*

- 219901 Introduction to Engineering Design (**PLTW**)
- 470322 Industrial Maintenance Electrical Principles
- 470348 Industrial Maintenance Electrical Motor Controls
- 470330 Industrial Maintenance of PLC
- 219903 Digital Electronics (**PLTW**)

Note: (PLTW) courses require an agreement between Project Lead The Way and the Local School District please see the link to [PLTW Program Requirements](#) for further information.

**EXAMPLE
ILP-RELATED
CAREER TITLES**

Electrical Technician
Electrical Supervisor
Electrical Engineer

**CTE-PLTW HYBRID
CAREER PATHWAYS
2015-2016**

**FLUID POWER ENGINEERING
CIP 15.1103.00**

PATHWAY DESCRIPTION: This pathway provides the opportunity to blend Career & Technical Education (CTE) courses with Project Lead the Way (PLTW) courses to help students apply technical skills along with science, technology, engineering, and math (STEM) skills to solve real-world problems. Fluid Power Engineers design, fabricate, and test industrial hydraulic equipment. Fluid Power Engineers apply knowledge of hydraulic, pneumatic, and electrical principles to test equipment, and analyzes and records data, such as fluid pressure, flow measure, and power loss due to friction and parts wear. Fluid Power Engineers understand hydraulic symbols, reads system schematics, understands electrical principles, and is skilled in test procedures and instrumentation.

BEST PRACTICE CORE

*Foundational Skills Necessary for Career-Ready Measure:
(KOSSA/Industry Certification)*

*Complete (5) **FIVE CREDITS** from the following :*

- 219901 Introduction to Engineering Design (**PLTW**)
- 470321 Fluid Power
- 470316 Advanced Hydraulic Systems
- 470326 Pneumatic Systems
- 219902 Principles of Engineering (**PLTW**)

Note: (PLTW) courses require an agreement between Project Lead The Way and the Local School District please see the link to [PLTW Program Requirements](#) for further information.

**EXAMPLE
ILP-RELATED
CAREER TITLES**

Industrial Hydraulic Technician
Mechanical Engineer
Industrial Engineer
Pneumatic Specialist
Fluid Power Supervisor
Hydraulic Engineer

**CTE-PLTW HYBRID
CAREER PATHWAYS
2015-2016**

**FABRICATION ENGINEERING
CIP 15.1103.00**

PATHWAY DESCRIPTION: This pathway provides the opportunity to blend PLTW courses and CTE courses to promote training with applied technical skills and the science, technology, engineering and math required to solve real-world problems. The Fabrication Engineer design parts to engineering specifications that are required for the development of metal parts and interior metal structures. Fabrication Engineers work with Sheet Metal Technicians in the development of complex geometrical parts. The Fabrication Engineer provides direct support to the manufacturing industry in the areas of design, fabrication, modification and development of metal assemblies, components and sub-assemblies.

BEST PRACTICE CORE

*Foundational Skills Necessary for Career-Ready Measure:
(KOSSA/Industry Certification)*

*Complete (5) **FIVE CREDITS** from the following :*

- 219901 Introduction to Engineering Design (**PLTW**)
- 480816 Metal Trade Information & Metals
- 480813 Parallel Line Layout
- 480817 Sheet Metal 1-A
- 219902 Principles of Engineering (**PLTW**)

Note: (PLTW) courses require an agreement between Project Lead The Way and the Local School District please see the link to [PLTW Program Requirements](#) for further information.

**EXAMPLE
ILP-RELATED
CAREER TITLES**

Manufacturing Engineer
Sheet Metal Engineer

**CTE-PLTW HYBRID
CAREER PATHWAYS
2015-2016**

**WOOD MANUFACTURING ENGINEERING
CIP 03.0509.00**

PATHWAY DESCRIPTION: This pathway provides the opportunity to blend Career & Technical Education (CTE) courses with Project Lead the Way (PLTW) courses to help students apply technical skills along with science, technology, engineering, and math (STEM) skills to solve real-world problems. Wood Manufacturing Engineers design and create interior cabinets and wood products for homes and businesses. Wood Manufacturing Engineers consult with clients and Cabinetmakers for cutting, shaping wood, preparing surfaces and forming a completed product.

BEST PRACTICE CORE

**EXAMPLE
ILP-RELATED
CAREER TITLES**

*Foundational Skills Necessary for Career-Ready Measure:
(KOSSA/Industry Certification)*

*Complete (5) **FIVE CREDITS** from the following :*

- 219901 Introduction to Engineering Design (**PLTW**)
- 480740 Wood Product Manufacturing
- 480731 Cabinet Making Technology
- 480716 Lumber Grading and Drying
- 219904 Computer Integrated Manufacturing (**PLTW**)

Note: (PLTW) courses require an agreement between Project Lead The Way and the Local School District please see the link to [PLTW Program Requirements](#) for further information.

Wood Product
Supervisor

Wood Technologist

Wood Product
Engineer

**CTE-PLTW HYBRID
CAREER PATHWAYS
2015-2016**

**AUTOMOTIVE ENGINEERING
CIP 15.0803.00**

PATHWAY DESCRIPTION: This pathway provides the opportunity to blend Career & Technical Education (CTE) courses with Project Lead the Way (PLTW) courses to help students apply technical skills along with science, technology, engineering, and math (STEM) skills to solve real-world problems. A program that prepares individuals to apply basic engineering principles and technical skills in support of engineers and other professionals engaged in developing, manufacturing and testing self-propelled ground vehicles and their systems. Includes instruction in vehicular systems technology, design and development testing, prototype and operational testing, inspection and maintenance procedures, instrument calibration, test equipment operation and maintenance, and report preparation.

BEST PRACTICE CORE

**EXAMPLE
ILP-RELATED
CAREER
TITLES**

*Foundational Skills Necessary for Career-Ready Measure:
(KOSSA/Industry Certification)*

Automotive Engineer
Service Manager

*Complete (6) **SIX CREDITS** from the following :*

- 219901 Introduction to Engineering Design (**PLTW**)
- 470507 Automotive Maintenance and Light Repair Section A and Lab
- 470509 Automotive Maintenance and Light Repair Section B and Lab
- 470511 Automotive Maintenance and Light Repair Section C and Lab
- 470513 Automotive Maintenance and Light Repair Section D and Lab
- 219903 Digital Electronics (**PLTW**)

Note: (PLTW) courses require an agreement between Project Lead The Way and the Local School District please see the link to [PLTW Program Requirements](#) for further information.

**CTE-PLTW HYBRID
CAREER PATHWAYS
2015-2016**

**CONSTRUCTION ARCHITECTURAL ENGINEERING
CIP 15.0101.02**

PATHWAY DESCRIPTION: This pathway provides the opportunity to blend Career & Technical Education (CTE) courses with Project Lead the Way (PLTW) courses to help students apply technical skills along with science, technology, engineering, and math (STEM) skills to solve real-world problems. A program that prepares individuals to apply basic engineering principles and technical skills in support of architects, engineers and planners engaged in designing and developing buildings, urban complexes, and related systems. Includes instruction in design testing procedures, building site analysis, model building and computer graphics, structural systems testing, analysis of prototype mechanical and interior systems, report preparation, basic construction and structural design, architectural rendering, architectural-aided drafting (CAD), layout and designs, architectural blueprint interpretation, building materials, and basic structural wiring diagramming.

BEST PRACTICE CORE

*Foundational Skills Necessary for Career-Ready Measure:
(KOSSA/Industry Certification)*

*Complete (5) **FIVE CREDITS** from the following :*

- 219901 Introduction to Engineering Design (**PLTW**)
- 460201 Introduction to Construction Technology
- 460212 Floor and Wall Framing
- 460213 Ceiling and Roof Framing
- 219905 Civil Engineering & Architecture (**PLTW**)

Note: (PLTW) courses require an agreement between Project Lead The Way and the Local School District please see the link to [PLTW Program Requirements](#) for further information.

**EXAMPLE
ILP-RELATED
CAREER TITLES**

Flooring Engineer
Construction Engineer
Structural Engineer

**CTE-PLTW HYBRID
CAREER PATHWAYS
2015-2016**

**STRUCTURAL ENGINEERING
CIP 14.0803.00**

PATHWAY DESCRIPTION: This pathway provides the opportunity to blend Career & Technical Education (CTE) courses with Project Lead the Way (PLTW) courses to help students apply technical skills along with science, technology, engineering, and math (STEM) skills to solve real-world problems. A program that prepares individuals to apply basic engineering principles and technical skills in support of architects, engineers and planners engaged in designing and developing buildings, urban complexes, and related systems. Includes instruction in design testing procedures, building site analysis, model building and computer graphics, structural systems testing, analysis of prototype mechanical and interior systems, report preparation, basic construction and structural design, architectural rendering, architectural-aided drafting (CAD), layout and designs, architectural blueprint interpretation, building materials, and basic structural wiring diagramming.

BEST PRACTICE CORE

*Foundational Skills Necessary for Career-Ready Measure:
(KOSSA/Industry Certification)*

*Complete (5) **FIVE CREDITS** from the following :*

- 219901 Introduction to Engineering Design (**PLTW**)
- 460201 Introduction to Construction Technology
- 460218 Construction Forms
- 460214 Site Layout and Foundations
- 219905 Civil Engineering & Architecture (**PLTW**)

Note: (PLTW) courses require an agreement between Project Lead The Way and the Local School District please see the link to [PLTW Program Requirements](#) for further information.

**EXAMPLE
ILP-RELATED
CAREER TITLES**

Engineering Technology
Instructor

Architect

Interior Designer

Home Improvement
Contractor

Carpenter

Construction Laborer

Construction Manager

Construction Supervisor

Project Manager

**CTE-PLTW HYBRID
CAREER PATHWAYS
2015-2016**

**ELECTRICAL CONSTRUCTION ENGINEERING
CIP 15.0303.00**

PATHWAY DESCRIPTION: This pathway provides the opportunity to blend Career & Technical Education (CTE) courses with Project Lead the Way (PLTW) courses to help students apply technical skills along with science, technology, engineering, and math (STEM) skills to solve real-world problems. A program that prepares individuals to apply technical knowledge and skills to install, operate, maintain, and repair electric apparatus and systems such as residential, commercial, and industrial electric-power wiring; and DC and AC motors, controls, and electrical distribution panels. Includes instruction in the principles of electronics and electrical systems, wiring, power transmission, safety, industrial and household appliances, job estimation, electrical testing and inspection, and applicable codes and standards.

BEST PRACTICE CORE

*Foundational Skills Necessary for Career-Ready Measure:
(KOSSA/Industry Certification)*

*Complete (5) **FIVE CREDITS** from the following :*

- 219901 Introduction to Engineering Design (**PLTW**)
- 460316 Circuits I (*1.5 credits*)
- 460319 Circuits II (*1.5 credits*)
- 219903 Digital Electronics (**PLTW**)

Note: (PLTW) courses require an agreement between Project Lead The Way and the Local School District please see the link to [PLTW Program Requirements](#) for further information.

**EXAMPLE
ILP-RELATED
CAREER TITLES**

Electrical Engineer

Electrical Engineering
Tech

Electrician